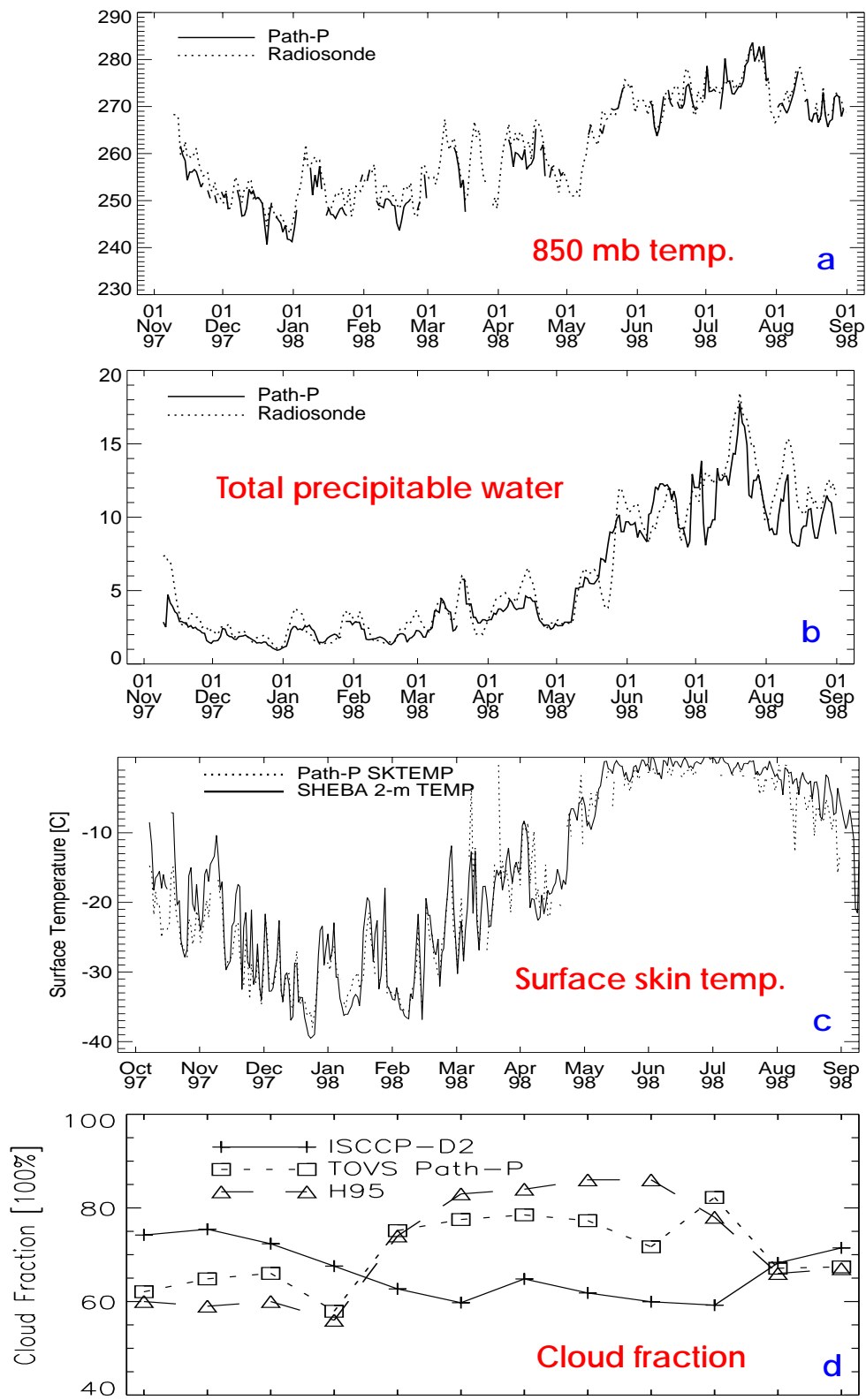# Summary of TOVS Polar Pathfinder Data Set and Applications
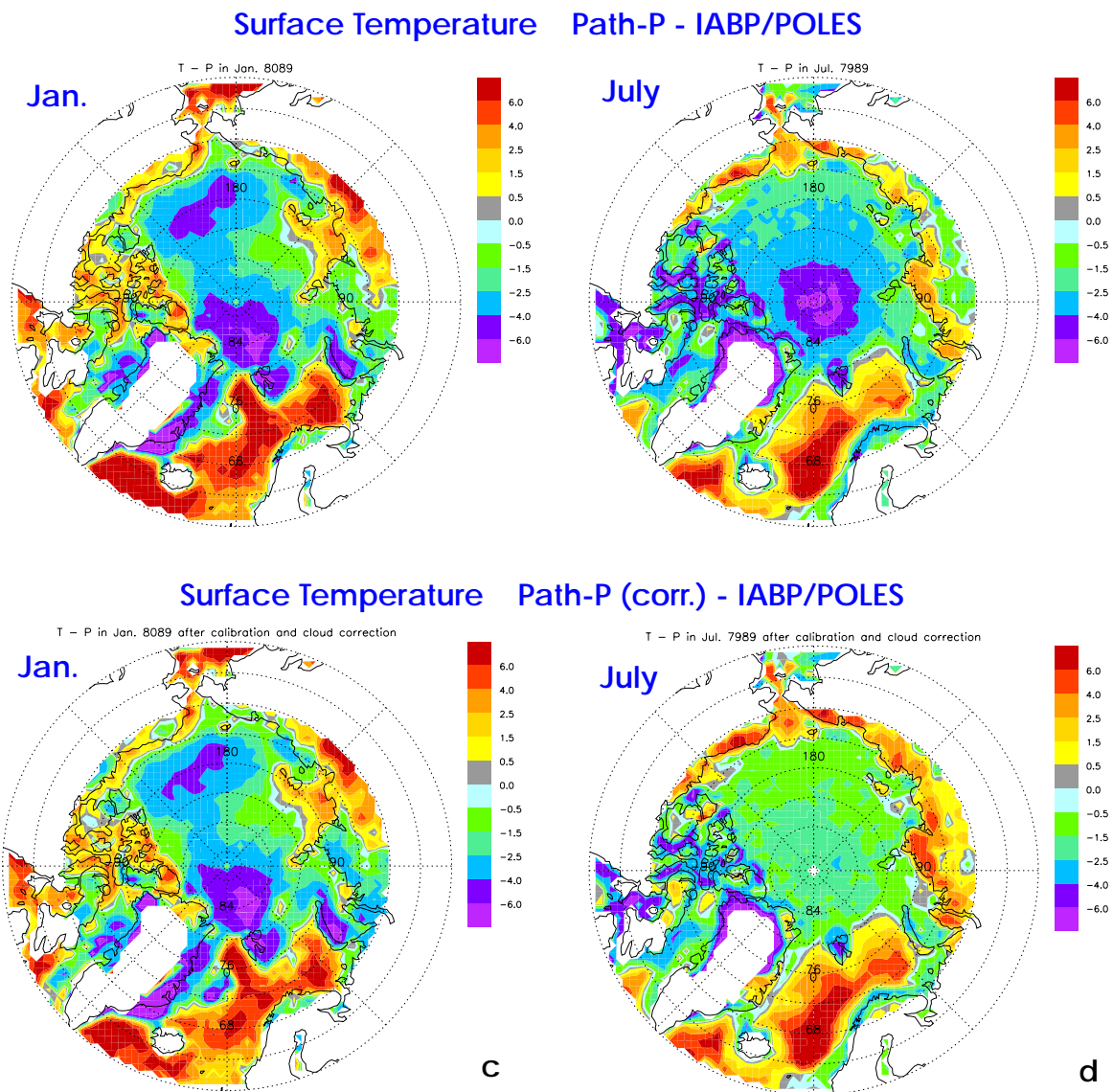
Path-P Data Set

- Generated from nearly 20 years of TOVS (TIROS Operational Vertical Sounder) satellite radiances as a part of the NOAA/NASA Pathfinder Program

- Daily and monthly fields from 1979 to 1998

- 100 km x 100 km resolution, north of 60°N, EASE grid, HDF format

- Radiances processed with the Improved Initialization Inversion ("3I") algorithm (Chédin et al, 1985), improved for polar conditions by Francis (1994)

- Extensively validated with data from Russian NP stations, SHEBA, HARA, POLES, and COADS

- Documentation, validation, and data available from NSIDC and http://psc.apl.washington.edu/pathp/pathp.html

Validation of Path-P Products with SHEBA Data

Surface Skin Temperature

Surface Temperature   Path-P – IABP/POLES


## Surface Temperature   Path-P (corr.) – IABP/POLES

Comparisons of Path-P skin temperatures to the IABP-POLES data set of near-surface air temperature reveal large discrepancies. In both January (a) and July (b) the Path-P fields are colder than IABP-POLES over sea ice in a comparison of decadal mean values (1980 to 1989), while over the GIN Seas, Path-P is warmer. We found that some of the difference (up to 1.7 degrees) is caused by intersatellite calibration problems. In summer the detection of low clouds is especially difficult, and we find that Path-P pixels with >95& retrieved cloud cover have large errors (too cold) in surface temperature. Plots (c) and (d) show the decadal differences again, but with these corrections applied. July fields over ice are much improved.
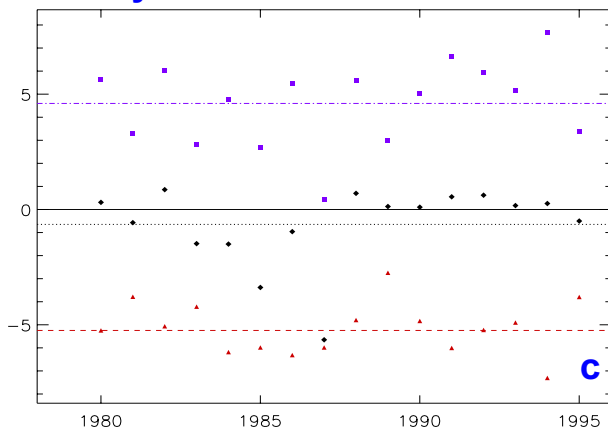
Validation of Surface Skin Temperature
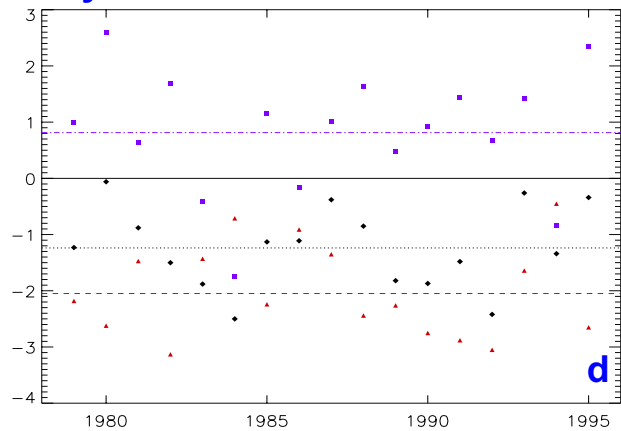

January -- Central Arctic
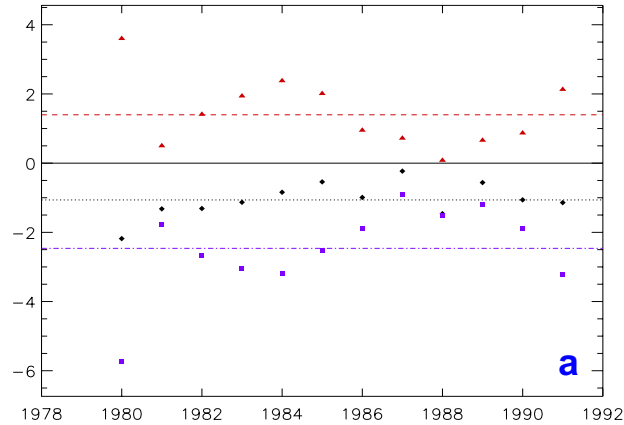
July -- Central Arctic
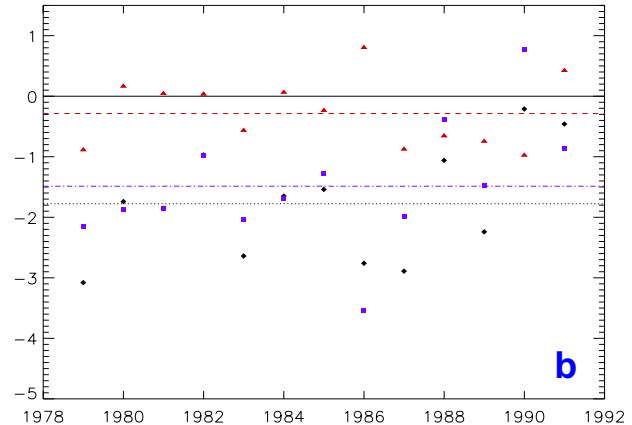
January -- GIN Seas

July -- GIN Seas

Path-P − COADS   **IABP/POLES − COADS**   **Path-P − IABP/POLES**

We investigate differences through comparisons to COADS data. Plot (e) compares January-mean IABP/POLES and Path-P values to COADS and NP measurements over the central Arctic Ocean between 1980 and 1991. January differences over sea ice are caused by the IABP-POLES being too warm, probably because data were interpolated over large distances and insulation of buoys by snow. In July (b) shows Path-P values are slightly too cold compared to COADS data, probably caused by cloud effects. In the GIN Seas IABP-POLES is consistently colder than COADS in both January (c) and July (d), which is again likely due to interpolation across large distances. Path-P data compare very well with COADS data in the GIN Seas, suggesting that Path-P data are more realistic than IABP/POLES values in this area. Over sea-ice and open-ocean areas, corrected Path-P temperature retrievals appear to be superior to the IABP-POLES fields.